

Statement by
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Introduction.

Good morning, Chairman Boehlert, Ranking Member Gordon, and Members of the Committee. I thank you for the opportunity to appear before you this morning to discuss the question of how the government may help spur innovation in the energy sector, and may best obtain access to the most innovative energy research and development available.

I would like to first offer a brief description of my own background which may help put my remarks in context. I spent the first ten years of my professional life conducting research, first in graduate school at MIT, funded in part with DOE grants, and later at AT&T Bell Laboratories and the Naval Research Laboratory. Because my work has included issues of technology transfer, intellectual property, Cooperative Research and Development Agreements, and other linkages between researchers and the commercial sector, I had already become fascinated by the novel approach to technology development and deployment taken by In-Q-Tel prior to joining the staff in 2003. At In-Q-Tel, I have focused on searching for nascent technologies at universities, federal laboratories, and other emerging sources to help orchestrate their commercialization for sustainable delivery to the Intelligence Community.

Background.

In-Q-Tel is a strategic venture capital firm that makes investments to benefit the United States Intelligence Community (IC). Here is how it works: As an independent, non-profit, government-funded firm, In-Q-Tel engages start-ups, emerging and established companies, universities, and research labs to identify technology innovations and products that can solve the Intelligence Community's most challenging problems. In-Q-Tel then employs venture capital investments, often coupled with product development funding, to create sustainable technology solutions to be delivered to the Intelligence Community from thriving commercial companies. Our focus is on companies and technologies principally directed at the commercial market that also address the needs of our government partners, because of the significant benefits of commercial technologies I address below.

In-Q-Tel is flexible in how it structures its investments to foster win-win relationships, providing the Intelligence Community with early access to emerging technologies and providing In-Q-Tel's portfolio companies with government business development guidance. We are very different than a government agency, but we are using the genius of the marketplace to benefit the government, and it is working. For every dollar In-Q-Tel invests, In-Q-Tel leverages an average of eight dollars of private investment to bring technologies to the market, helping to lower both development costs and total life-cycle costs for the benefit of the Intelligence Community. In addition, returns to date on our investments have allowed In-Q-Tel to add approximately 15 million dollars to its investments pool which is being used to further its mission.

In-Q-Tel is bound by a Charter agreement with the CIA, which sets out the relationship between the two organizations and which is supplemented by annual funding through the Intelligence Community. In-Q-Tel is not part of the CIA and is not a government agency, but the five-year span of each renewable Charter agreement between the CIA and In-Q-Tel provides a beneficial perspective that facilitates long-term planning. And as a government contractor operating as an independent nonprofit corporation, In-Q-Tel receives regular oversight from the CIA, which keeps Congress informed of the company's activities.

The company is governed by an independent Board of Trustees composed of former cabinet officers and officials from defense and the Intelligence Community, as well as CEOs of major companies, university leaders, and leaders of the investment industry.

As you know, Mr. Chairman, In-Q-Tel grew out of the recognition in the late 1990s by the Director of Central Intelligence George Tenet and others that the CIA and the rest of the U.S. Intelligence Community needed the very best technology available to fulfill its mission. This led the Director to ask a group of distinguished Americans to create a company that would explore creative ways to access private sector innovation and technology development – a process, resulting in In-Q-Tel, led by former Lockheed President and CEO Norm Augustine. Today's hearing acknowledges the insightful contribution to this discussion of the National Academies panel on American Competitiveness also led by Norm Augustine, and the panel's recent report, "Rising Above the Gathering Storm." We are incredibly fortunate that Norm Augustine has served on our Board of Trustees since In-Q-Tel's founding, and that he has been joined on our Board by such visionaries as Lee Ault, Anita Jones, Charles Vest, Jim Barksdale, Bill Perry, and others.

In-Q-Tel has also been the focus of a number of thoughtful studies that describe and scrutinize the organization, examining its structure and effectiveness. In one example, an assessment was made by a panel from Business Executives for National Security (BENS), a national, non-partisan, and not-for-profit organization of business leaders – 30 of whom formed the independent panel after the CIA selected BENS to conduct the congressionally mandated study. The report, "Accelerating the Acquisition and Implementation of New Technologies for Intelligence: The Report of the Independent Panel on the Central Intelligence Agency In-Q-Tel Venture," was submitted to the CIA

and Congress (www.bens.org/highlights_InQTel.html). The panel concluded that In-Q-Tel had achieved significant early progress and that “creating a model like In-Q-Tel makes good business sense.” In a second example, the Harvard Business School published a Case Study that examined In-Q-Tel’s history, strategy, and effectiveness in the context of other federal technology development programs such as Small Business Innovation Research set-asides, the Advanced Technology Program, DARPA, and Federally Funded Research and Development Centers (Case 9-804-146, <http://harvardbusinessonline.hbsp.harvard.edu>).

Since our founding in 1999, we have delivered more than 130 technologies responding directly to CIA and Intelligence Community missions, bolstered by more than 90 pilot programs and more than 30 specific technology adoptions. Technology delivered by In-Q-Tel, for example, makes it possible to fuse data from maps, images, text and other sources; visualize information in ways not previously possible; rapidly process vast amounts of information in multiple languages; make sense of seemingly unconnected information; and identify the most critical intelligence faster and more effectively.

The In-Q-Tel approach.

In order to help identify technology solutions that can address capability needs of the Intelligence Community, In-Q-Tel has a broad outreach policy. In addition to soliciting business plans via its web site www.In-Q-Tel.org, In-Q-Tel actively scouts for technologies and investment opportunities by capitalizing on its technology network that includes other venture investors, university faculty and technology commercialization offices, national and corporate laboratory researchers and their licensing offices, and program managers at Government funding agencies. We have also engaged with nearly 90 commercial companies, most of which were previously unknown to the government, and 11 universities and research labs, which In-Q-Tel identified through its commercial and academic outreach programs. In-Q-Tel has also received and subsequently reviewed over 5,500 business plans. As part of this outreach, we have also cultivated a network of more than 200 venture capital firms and 100 labs and research organizations, further broadening the Intelligence Community’s access to innovative technologies.

Before In-Q-Tel makes an investment, members of three teams conduct diligence to ensure that the investment is on firm footing – to use an analogy, three legs of a stool must be supported. The first team consists of CIA employees who are members of the In-Q-Tel Interface Center, or the “QIC” (pronounced “quick”), which serves as the executive agent for our interaction with partners throughout the Intelligence Community. The QIC leads an annual and ongoing “problem set” definition process through consultation with end users throughout the Intelligence Community, to ensure that the solutions being evaluated by In-Q-Tel experts are likely to be adopted by users among our government partners. The QIC provides In-Q-Tel with knowledge about the technology needs of the CIA and other government partners in the Intelligence Community through regular and ongoing discussions with the leadership, the policy

makers, and the operators in our partner organizations – and together we have established an extensive demonstration, pilot, and adoption program to facilitate technology transfer.

The team responsible for the second leg of the stool consists of In-Q-Tel's staff of technology experts who vet each technology opportunity against Intelligence Community needs, comparing alternative approaches and validating technical claims to ensure the technical robustness of the solution.

The third leg of the stool is the responsibility of In-Q-Tel's venture team members who examine the commercial market, review the company's business plan and evaluate the management team to gauge the potential for long term success in the market.

One of the strengths of the venture investing model is that In-Q-Tel's own technology, market, and business assessments are validated by the diligence conducted by its co-investors. Over the six years that In-Q-Tel has been in operation, In-Q-Tel has developed a reputation for conducting among the most rigorous technical due diligence in the investment community, and In-Q-Tel has found that other investors rely on In-Q-Tel's assessment of the soundness of technologies it examines.

Most of In-Q-Tel's investments involve evaluation of opportunities in which the technologies are already being commercialized by start-up companies. In the Information Technology arena, for example, comparing the CIA and our other government partners with any Fortune 500 company, one finds a 70 to 90 percent overlap in information technology needs for collecting, sorting, analyzing and distributing knowledge. Rather than seeking point solutions or one-off custom products designed explicitly for the Intelligence Community, In-Q-Tel invests in companies that build successful technology solutions intended for the high growth commercial market and introduces these solutions to the Intelligence Community.

In some cases, however, In-Q-Tel engages at a very early stage, before the technology has been spun out of the laboratory. In those cases in which the technology and the commercial market are robust and the Intelligence Community need for the solution is critical, In-Q-Tel will strategize to move the technology from the laboratory into a spinout, by assembling a management team and providing seed funding. In-Q-Tel uses its network in the venture community to assist with these activities and will engage only if the spinout can address a substantial commercial market.

The roles of In-Q-Tel and DARPA contrasted.

As the Committee has noted, some have suggested that an ARPA-E should be designed to foster directed basic research, and other proponents suggest its role should be to get products into the marketplace. In-Q-Tel was founded to address a specific and unique challenge that is somewhat related: namely, how to provide the U.S. Intelligence Community with access to the technology innovations being brought to the commercial market by small, start-up companies, or other sources of innovation such as national labs

and universities, who may not target the Government for sales. Like any other venture investor, In-Q-Tel “cherry picks” technologies with high potential for commercial success. Because In-Q-Tel is a strategic investor for the Intelligence Community, In-Q-Tel selects from the entire range of commercially viable technologies those that have relevance to Intelligence Community mission.

In-Q-Tel’s venture capital model is not a substitute for fundamental research funding, but rather leverages government and private sector investments in research. In fact, the majority of the companies in which In-Q-Tel has invested have their roots in fundamental research conducted at universities and laboratories supported by NSF, DOE, ONR, and DARPA. Moreover, before the products are delivered back to the Government, other private investment capital in addition to In-Q-Tel’s has been invested in the companies, leveraging additional private sector resources to deliver a better product to government.

As you know, Chairman Boehlert, the President’s Science Advisor, Dr. John Marburger, testifying to your committee just last month alongside Secretary of Energy Samuel Bodman regarding the 2007 budget, noted the critical role that basic research plays as the foundation of our Nation’s economic competitiveness – a message President Bush supported in his State of the Union address through the announcement of his American Competitiveness Initiative and the Advanced Energy Initiative. The American Competitiveness Initiative calls for a doubling, over ten years, of the support of basic research in the physical sciences funded through the National Science Foundation, the National Institute for Standards and Technology, and the Department of Energy’s Office of Science; and the Advanced Energy Initiative provides for a 22 percent increase in clean-energy research at the Department of Energy. These initiatives reflect the need to accelerate our breakthroughs in the vital arena of energy independence and innovation which your Committee is focusing on now.

On the development timeline from incipient idea to fully productized, off-the-shelf commodity, In-Q-Tel typically engages sometime after the demonstration of a working prototype. That is, In-Q-Tel does not typically invest in early research the way that DARPA or other Government funding agencies do, but rather, takes the output of early research and supports its development into technology products and sustainable commercial outlets from which to buy those products. In some cases, In-Q-Tel provides very directed “gap funding” to assist in bridging the so-called “valley of death” between the basic research funding and the point at which the technology opportunity is sufficiently mature as to readily attract institutional investors or, in the case, of DARPA, be ready for delivery under a DoD procurement or acquisition program.

As an investor, In-Q-Tel can influence the product development roadmap to ensure that the commercial products will indeed meet the Intelligence Community’s needs while adding value for the commercial customers as well. Among the advantages of commercial technology are lower initial and long-term costs, easier integration, longer technology lifetime, faster development, better user interfaces, incremental upgrades, and next-generation improvements, all developed by leveraging success in the commercial

marketplace. Our success stems from linking commercial viability and technical excellence with our government partners' needs.

When government is not the primary or early user of a technology.

One of the elements that In-Q-Tel considers essential for its success is a deep understanding of our Government partners' needs, challenges, and pain points, which we derive through our interactions with the QIC and the interface centers at other various agencies we work with. Indeed, being able to offer the U.S. Government Intelligence Community agencies as potential early adopters of the technologies is a unique value proposition In-Q-Tel brings to its portfolio companies and co-investors. These early revenue opportunities coupled with the validation by a discerning customer are quite useful as these companies work toward commercial market penetration.

By contrast, the "customers" for the products of energy research are diverse, ranging from the individual consumer who buys an alternative fuel vehicle to the large utility companies who provide power to the grid. That is, there is no single procurement mechanism, and this market can be significantly impacted by policy and regulation that may provide incentives or disincentives to early adoption.

From the customer perspective, the challenge that motivates the formation of an ARPA-E is similar to that faced by the National Institutes of Health (NIH). The fundamental research funded by NIH must be transferred to the commercial sector for maturation and productization before the customer (ultimately the taxpayer who has need of a therapy) can benefit. The pathway from research to product in the case of healthcare typically involves costly and time-consuming clinical trials supported by private investment dollars invested with the expectation of return in the form of profit from lucrative sales in the pharmaceutical or medical device markets. Moreover, similar to the energy sector, the healthcare sector is strongly impacted by external factors such as cost reimbursement (insurance) that can serve as incentive or disincentive to making such investments.

Barriers and incentives.

At the risk of oversimplification, and assuming a healthy supply of new technologies being created as a result of basic research funding, the barriers to such new technologies being brought to the market can all be distilled down to one factor: money in the marketplace. Companies will only take on the task of productizing a new technology if there is a high probability that they will make money selling the product. That statement is true regardless of whether the customer for the product is the Government or the wider commercial market.

Returning to the NIH example, a company is likely to productize a new therapy only if there is a likelihood that they will make money selling the therapy; that is, the patient population is large enough and both willing and able to pay for the therapy and the cost

margins are such that the company will make a profit. The healthcare market, like the energy market, is subject to influence by policy initiatives; an example would be expanding health insurance coverage to enable patients to pay for new therapies which would have the effect of increasing the size of the market and the probability that a company entering that market with a new therapy could make money. The market in the energy sector is subject not only to influence by policy initiatives but also by global economic trends.

One of the observations that led to the founding of In-Q-Tel is that if the Government is the only customer and the Government has a critical need for the product, there is a higher likelihood that the Government will overpay relative to the situation in which the Government's critical needs can be satisfied with a product that can also be sold in the larger commercial market. In-Q-Tel was designed to ensure that the Government can get access to commercial products that will address the Government's critical needs at the lowest cost and greatest impact possible. In-Q-Tel does not invest in companies that do not have a commercial market; the In-Q-Tel model does not apply to those cases.

The In-Q-Tel model as part of the solution.

I hope that in this discussion I have been able to describe the strengths of the In-Q-Tel model for responding to specific needs within the Intelligence Community. Certainly, fundamental research remains a requirement for creating game-changing innovations in all sectors, including energy. Based on In-Q-Tel's success at using venture capital tools to accelerate the rate at which In-Q-Tel's customers get access to new technologies, this Committee may wish to consider incorporating into the design of ARPA-E some elements of the In-Q-Tel model to assist with bridging the gap between basic research and commercial viability. We can summarize our approach as follows. By utilizing equity investments, sometimes coupled with work programs and market guidance, In-Q-Tel fosters the development of strong companies which produce commercially viable technologies that at the same time solve critical Intelligence Community mission challenges. There may be parallels for the energy market.

Note, however, that the general direction of In-Q-Tel technology transfer is from the commercial side to the government (tech transfer in), while the technology transfer challenge for energy is in many cases to convert energy research into products that can be sold commercially (tech transfer out) – to a customer set, or market, that is more diverse and fractured than in the Intelligence Community, requiring an examination of the implications for the value proposition to the portfolio company.

There may be merit to incorporating into ARPA-E a mechanism to provide the kind of technical and market diligence, aimed at commercial viability, that In-Q-Tel conducts prior to making its investments. This kind of diligence based on investor perspectives could be very valuable in informing the selection of research projects for continued development with ARPA-E support. There is a lot to be said for the screening that accompanies investing one's own capital in a project, and the dynamics of a venture

capital investing market can provide effective commercial peer review that for technologies at a later stage of maturity (at the edge of the “valley of death”) parallels the benefits of scientific peer review that occurs on the basic research and development end of the spectrum.

Returning to the analogy of a stool that for stability requires all three legs to be well-supported, it is a third leg – the customer input – that would necessarily differ in the energy market from the In-Q-Tel model because of the diversity of the customer base, the lack of a single procurement mechanism and the susceptibility of the energy market to manipulation by policy initiatives and global economic events.

Conclusion.

Again, I thank the Committee for the chance to speak with you today, and I congratulate you for tackling the crucial national need for groundbreaking innovation in the energy market. Creating additional avenues for basic science and for commercial opportunities may help attract the best and the brightest to energy research, as it has in the past to such historic efforts as the space race of the 1960s and the internet boom of the 1990s.

Bio of Dr. Catherine Cotell
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Dr. Catherine M. Cotell received her B.A. in chemistry and mathematics from Wellesley College and her S.M. and Ph.D. degrees from the Massachusetts Institute of Technology in metallurgy and materials science and engineering, respectively. After two years as a member of technical staff at AT&T Bell Laboratories, Dr. Cotell joined the staff of the US Naval Research Laboratory (NRL), where she conducted research in surface modification and thin film coatings for electronic, optical and biomedical applications. She joined the staff of the Technology Transfer Office at NRL in June of 1997 and assumed the position of head of the Office in April of 1999. As head of Technology Transfer, she evaluated, managed and marketed NRL's intellectual property portfolio, negotiated Cooperative Research and Development Agreements (CRADAs) and patent license agreements, and facilitated collaborations and interactions between NRL researchers and the commercial sector. In July of 2003, Dr. Cotell joined the staff of In-Q-Tel, the venture catalyst for the Central Intelligence Agency (CIA) as Vice President for University Outreach. Dr. Cotell launched In-Q-Tel's University and Federal Laboratory Outreach program to search for emerging technologies at universities and federal laboratories and orchestrate their commercialization for sustainable delivery to the Intelligence Community. Dr. Cotell's responsibilities at In-Q-Tel have expanded to include providing strategic direction for the company as Vice President for Strategy, University and Early Stage Investment.